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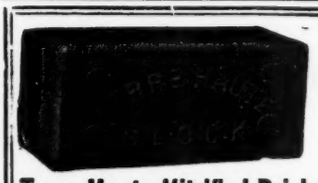

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Contributed Articles and Reports.

Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send to Municipal Journal and Public Works regularly their annual and special reports.

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PUBLIC OWNERSHIP OF PUBLIC UTILITIES.

Recent happenings promise to give a fresh impulse to the idea of public ownership of public utilities. During the past twenty-five years experience in both public ownership and public control has been accumulating, but even yet it is questionable whether decisions of municipalities in the matter are always made wisely or even on any basis of practical reasoning but are not rather governed by impulse and prejudice untempered by judgment based on experience. "The company is overcharging us for rotten service; let's have our own plant and put them out of business" is too often the deciding argument.

Municipal ownership can be made highly successful—Municipal Journal and Public Works has described several such cases. But it can also be a rank failure. In some instances either public or private ownership could succeed with half-way efficient management; in others, only the most highly efficient management could make the plant a success. And public ownership labors under some handicaps that private does not, handicaps that may more than offset the chief advantage of public ownership—that it does not have to pay dividends, but only a low rate of interest on bonds.

To those cities which are considering which to adopt, public or private ownership, we recommend perusal of the ideas of one who has for more than twenty years managed one of the most successful municipal plants in the country, which ideas are given elsewhere in this issue.

BACKWARDNESS IN ROAD IMPROVEMENT.

When we read of the hundreds of millions of dollars that we are spending this year, or are preparing to spend, on road improvement, we are inclined to complacently smile and pat ourselves on the back as the greatest road builders of the ages. In gross amount to be spent (perhaps), we may be; but:

We have in the United States 2½ million miles of highway. France, with 65,000 miles of national highway to maintain, has a fund of $152,000,000. England, with 151,000 miles, has about $100,000,000 available this year. Our hard-surfaced roads total only one-tenth as great a length as those of France. We must spend $100,000,000 a year for twelve or thirteen years on road improvement (in addition to maintenance) in order to be able to serve directly 46 per cent of all the counties of the United States, with an additional 41 per cent adjacent to these routes.

We have been talking big figures, but how much work is really under way? Until we are actually at work on a billion dollars' worth of road improvement, we will not be in a position to feel greatly puffed up over the matter.

OPERATION OF LOUISVILLE FILTER PLANT

Removal of Bacteria and Suspended Matter, Amount and Cost of Chemicals Used, and Total Cost of Purification—Cleaning Sedimentation Reservoir—Brass Holding-down Screens in Filters Removed.

The water supply of Louisville, Ky., is furnished by the Louisville Water Company, the stock of which is owned by the city of Louisville, the works being operated by a municipal board of waterworks. Water is obtained from the Ohio river and pumped to a filtration plant on Crescent Hill.

These filters operated very satisfactorily during the year 1918, the average bacterial removal being 99.4 per cent and the suspended matter being totally removed. A total of 7,623 tons of mud were removed, an average of 20.9 tons a day or 1,286 pounds per million gallons of water. Although the average turbidity was 12 per cent less than in 1917, the total amount of water filtered was 12½ per cent greater and the cost of chemicals was increased by the same amount, being $31,417. An examination made during the year of the brass screens between the sand and the gravel in the old filters, the purpose of which was to prevent the lifting of the gravel during the washing of the filters, showed that these screens had corroded through to a considerable extent and were in such condition that they were no longer of much service in performing the duty for which they were intended. Consequently the chief engineer and superintendent, James B. Wilson, decided to remove the screens and abandon their use altogether. To prevent the lifting of the gravel by the wash water, it was decided to increase the thickness of the gravel by four inches, and maintain the same thickness of sand above the gravel. In addition to this, it was found necessary to replace all the old strainer-plate bolts and repaint the exposed metal work. It was estimated that the cost of this would be about $700 for each filter.

The coagulating basins were cleaned in April and again in October, as has been the practice since the plant was put in operation. About 15,500 cubic yards of mud were washed out by fire hose and discharged on to low ground at the pumping station at the river. The north sedimentation reservoir also was cleaned during June and July, the mud in the bottom being found to be 24 inches thick over the entire basin, which had not been cleaned for three years. As the bottom of this reservoir is level and there are only two diagonal waterways through it, the cleaning was difficult and expensive, especially since common labor was scarce even at 45 cents per hour. To aid in removing the mud, a three-drum hoisting engine was rigged upon a movable platform on one side of the walk along the top of the embankment and to this was reeved an endless cable leading to the other side of the basin. To this cable was fastened a wooden V-shaped drag, which was run backward and forward across the floor of the reservoir, scraping the mud to the open waterways, where it was washed out by fire hose into a sewer. Meantime, six or eight 1½-inch streams were kept washing the mud to the gutters, the water being furnished by a motor-driven centrifugal pump located in the gate house and giving a nozzle pressure of about eighty pounds. With this pressure the mud was broken up and carried in a semi-liquid state by the drag to the gutters. The amount of solid mud so removed was 21,00 cubic yards. After it had all been removed, the walls and bottom of the entire basin were patched and the cracks around the stones pointed up. The labor cost of this work was $3,547.

The Board of Waterworks is continuing its improvements of the property around the filter plant and pumping stations by the planting of trees, shrubs and flowers, and intends to build at Crescent Hill a swimming pool 300 feet long and 150 feet wide, in the park which has been created on its property at this point.

The total amount of water filtered was 11,857,589,199 gallons, of which 245,566,500 gallons, or 2.07 per cent, was used for washing the filters. The rate of filtration for the old filters averaged 142,800,000 gallons per acre per day, and the new filters 142,400,000 gallons.

In purifying this amount of water there were used 1,441,100 pounds of sulphate of alumina, or 0.85 grains per gallon of water; 9,805 pounds of hypochlorite, or 7.84 pounds per million gallons treated, and 17,030 pounds of liquid chlorine, or 1.72 pounds per million gallons. No copper sulphate was used last year.

The chemicals cost: For sulphate of alumina, $21,291.90, or $1.857 per million gallons treated; for hypochlorite, $289.57, or 23.5 cents per million gallons treated; for liquid chlorine, $2,690.07, or 26.4 cents per million gallons treated; and for all chemicals, $24,271.54, or $2.08 per million gallons filtered.

The alkalinity of the river water averaged 53 for the year, varying from 34 in March to 77 in December; that of the filtered water averaged 47, varying from 22 in March to 65 in December. The bacteria per c.c. in the river water averaged 10,895, varying from 878 in August to 36,070 in February; those in the filtered water averaged 67, varying from 7 in April to 173 in October. The turbidity of the river water varied from 17 in October to 675 in February; that of the filtered water was uniformly zero. The amount of aluminum sulphate used varied from 0.54 grains per gallon in October to 1.49 in February; following the fluctuations in turbidity in a general way, but not uniformly.

The treatment reduced the free ammonia from 0.223 parts per million to 0.171, or 23.3 per cent; the albuminoid ammonia from 0.448 p.p.m. to 0.253, or 43.5 per cent; the oxygen consumed from 4.14 to 1.36, or 67 per cent. The total hardness remained practically the same, but 6 parts of temporary hardness were changed to permanent hardness.

The B. Coli averaged 2,093 per 100 c.c. in the river water and 3 in the filtered water. The reservoirs removed 56.2 per cent of the bacteria, the coagulating basins 41.3 per cent (94.3 per cent of those entering the basins), and the filters 1.9 per cent (76 per cent of those remaining in the water applied to the filters); the total removal being 99.4 per cent.

Of the suspended matter, 41.5 per cent, or 3,160 tons, was removed by the reservoirs; 49.5 per cent, or 3,780 tons, by the coagulating basin, and 9.0 per cent, or 683 tons, by the filters.

The total cost of filter operation was $50,171, or $4.234 per million gallons. This average comprised 39 cents for superintendent and laboratory payroll; 82 cents for filter operators' payroll; $2.05 for chemicals; 20 cents for wash water; 52 cents for heat, light and power; 8.2 cents for supplies; 7.5 cents for repairs, and 9.7 cents for incidentals. The cost per million gallons, averaged by months, varied from $3.23 in August to $6.09 in March; the heavy expenditures for supplies

and repairs in the latter month being chiefly responsible for the high rate.

The income of the water company for the year was $820,537, an increase of $43,521 over that of 1917. The expenses were $344,672, or $70,530 greater than in 1917. The company has no floating debt except $20,133 of meter deposits, and on Dec. 31st last had on hand $743,908 in cash, bonds, etc. During the year it reduced its bonded indebtedness by $404,000, and paid the city out of its reserve fund a $191,265 dividend, and expects to pay a similar amount this year. It also furnishes free to the city water valued at $150,000 a year. Of its total income, $31,410 was interest on it bank deposits and bonds owned, and $2,813 was real estate rents, and $781,382 was from water rents. Of the operating expenses, $125,796 was pumping station expenses; $47,838 was filter expenses; $26,287 was in connection with the distribution system; $68,529 was administrative. Including $43,931 interest on bonds, the total expenditure was $388,603; leaving the net earnings $431,934.

SEWAGE TREATMENT AT BRIDGEPORT.

History of the Studies of the Problem—Imhoff Tanks First Proposed—Fine Screens Finally Adopted and Under Construction.

By JAMES A. McELROY*

The city of Bridgeport, Connecticut, for years past having enjoyed remarkable growth in population, has, as one result of this growth, suffered from harbor pollution caused by the discharge of sewage, with the resultant nuisance and the destruction of its fishing industries The problem of sewage treatment has demanded and has received most thorough consideration, investigation, and study.

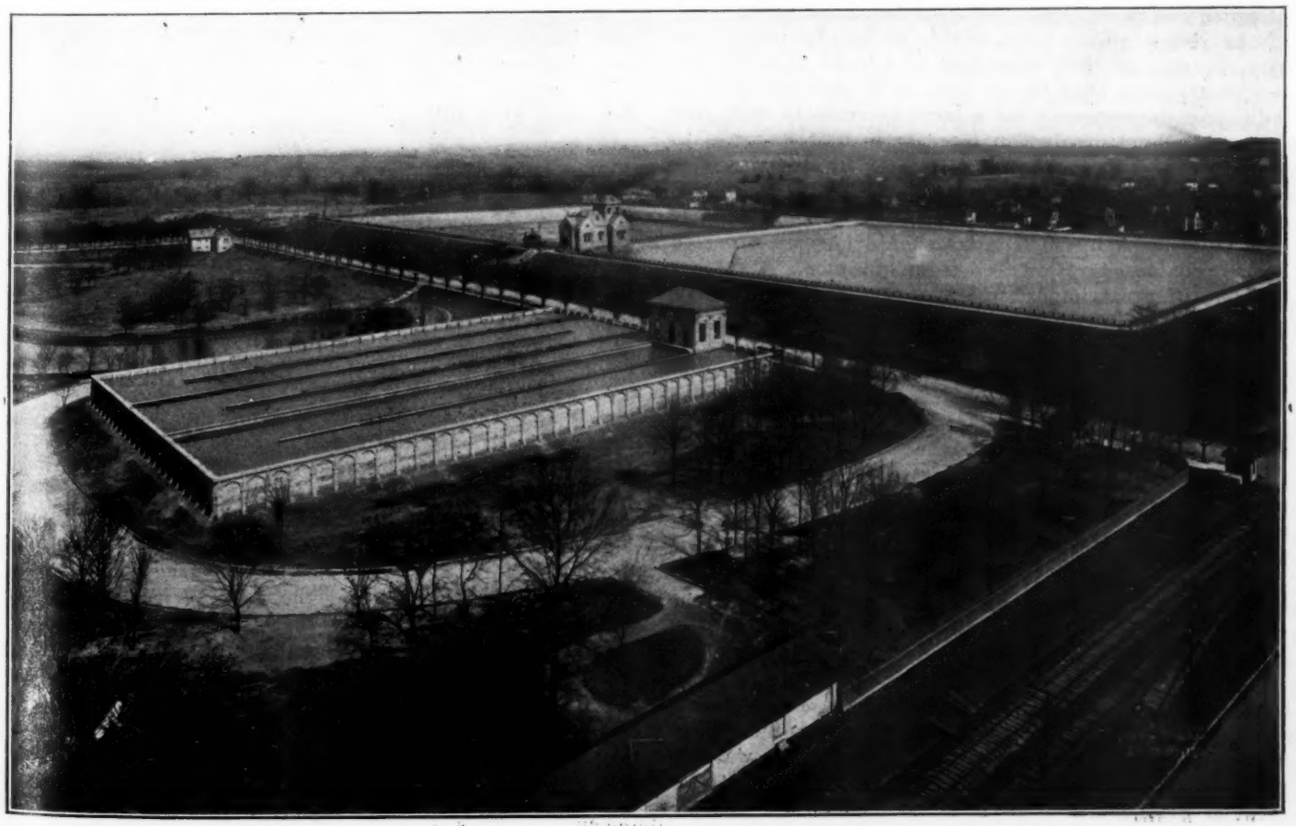
In 1908 plans for a comprehensive system of sewers intended ultimately to include sewage treatment were prepared by Hering and Fuller. All sewers built since that time have been in accordance with their recommendations, but investigation and study of the question of sewage treatment and disposal were continued.

In 1916 the firm of Hering and Gregory submitted a supplementary report modifying somewhat the earlier report of Hering and Fuller. They considered the advisability of bringing the sewage from the entire city to one treatment plant to be located on Steeplechase Island, but rejected this scheme in favor of the plan which divided the city into two sewage districts with a complete treatment plant for each district. In accordance with this report, the city let contracts for the construction of the Railroad avenue and Bostwick avenue interceptor to the site of the Western Division pumping station.

The consulting engineers and city engineer were in favor of an Imhoff tank sewage treatment plant, similar to the one at Albany, N. Y. The design for such a plant was completed and part of the work advertised for bids, but meanwhile information obtained as to the unsatisfactory operation of several Imhoff tank installations and of the satisfactory operation of fine screens for conditions similiar to those at Bridgeport, led the city authorities to hold up the work, in order to investigate the development and efficient operation of the fine-screen method of treatment, and its extensive operation throughout the United States. The result was that it was considered advisable to review the entire subject of sewage treatment and disposal and again investigate all types of plants in actual, practical operation, so that the conclusions previously reached might be confirmed, modified or rejected.

Accordingly, investigations and studies were undertaken and expert authorities sought and consulted. The entire project was restudied in the light of the latest practice and operating results. These investigations

*City Engineer of Bridgeport, Conn.



LOUISVILLE SEDIMENTATION TANKS, COAGULATION BASIN AND FILTERS.

were conducted by the Paving and Sewer Commission, the Department of Public Works, the City Health Board, and by the City Engineer. The subject was thoroughly considered by each of the departments having distinct connection with and interest in the economic and practical solution of the problem. Following the conclusions of the commissioners and officials, it was determined to secure the advice of the most expert engineers obtainable. For this purpose, Geo. W. Fuller of New York City, and Geo. A. Johnson (now Lt. Colonel in the U. S. Army), were called into consultation. These gentlemen made a thorough review of all previous findings and determinations, and undertook a new and separate investigation of the harbor waters and local conditions, particularly as pertaining to and affecting the western part of the city. It was ultimately determined, as a result of all foregoing investigations and studies, including those of the health authorities of both city and state, to adopt the fine screen method as the most reasonable and appropriate system of sewage treatment for Bridgeport.

The questions and data that had to be considered in reaching the conclusion that a fine screen plant was the best for this city were of much interest. The proposed Imhoff tank treatment plant plan had provided for an elaborately designed bar screen and grit chamber for the mechanical protection of the pumping machinery and the Imhoff tanks. Notwithstanding this preliminary treatment by bar screens and grit chambers, it was observed that several Imhoff tank plants in operation, of the latest construction and designed by some of the most eminent authorities, were unsatisfactory in operation and little better than failures, particularly from scum troubles, tank frothing, failure of sludge digestion, chamber fouling, overflowing, etc., these tanks often creating decided local nuisances.

Some important questions had to be considered as to the increase in size of Imhoff tanks, necessitated by the lack of working capacity as revealed by the latest plants designed and in service. The evidence showed that many of the recent plants were unable to handle more than fifty per cent of their estimated or figured capacity and few plants more than 60 per cent to 70 per cent, thereby indicating the necessity for a large increase in size; and that this would involve an increase in cost of tanks to provide the greater capacity called for by experience as required for operation and sludge digestion. Moreover. there were no really satisfactory data obtainable as to how much capacity such tanks should have in order to insure reliable operation free from nuisance. A further problem of great importance was presented by the immediate or early necessity of oxidation of the effluent upon sprinkling filters or by some other method, if tanks were used, which would involve further heavy expenditures.

It was observed that fine-screen treatment plants, extensively installed throughout the United States during the last four years, work successfully as independent sewage plants; also as auxiliaries to Imhoff tank plants, as at Rochester, N. Y., where fine screens before Imhoff tanks have made this one of the most effective plants operated in the country. Further, in consequence of the continued trouble experienced in the operations of the newly designed and constructed Imhoff tank treatment plant for the joint plant of Plainfield-Dunnellen, N. J., it was necessary at that plant to resort to the use of a fine screen installed before the Imhoff tanks, to overcome the difficulties of scum trouble in the tanks and sludge fermentation. In view of all the foregoing, it was determined to adopt the fine screen method of sewage treatment at Bridgeport.

The engineers also investigated the feasibility of several small screen stations for the district rather than one large station. This plan would reduce the cost of construction of the large sewers required to reach one treatment plant by gravity, and would also cut the cost of pumping. It was found, however, that construction of the extensive system of intercepting and collecting sewers originally planned had advanced to such an extent as to establish the point of treatment at one plant located in the southwestern part of the district. Considering the location of the plant and the method of treatment established, the only remaining problem was the design of the plant in combination with a pumping station.

With the sewage arriving at the point of treatment 22 feet below street grade, various combinations of screens and pumps were carefully planned and studied in an effort to avoid the additional expense of placing screens at a low elevation with practically all construction below tide level. Due consideration was given to the design of a plant looking to low-level pump section and high-level screen plant, from which the sewage which had been raised by the pumps would be discharged by gravity after passing the screens. There were several objectionable features to this plan, particularly the fact that pumped sewage would not submit so effectively to screen treatment as unpumped sewage. The ultimate design selected was that of fine-screen treatment at the low level of the gravity flow to the plant, and the pumping of screened effluent through a force main against the tide.

Specifications and plans were accordingly prepared, approved by the engineers, city and state health boards, by the various city departments, and by the Paving and Sewer Commission. Bids were publicly asked and received on July 10, 1918, and an award of the contract was made, subject to the approval of the necessary bond issue by the Federal Capital Issues Committee. This was duly received and the work authorized to proceed.

This plant, which is the result of a long-extended, thorough study and restudy of the problem, followed by carefully drawn conclusions, based not only on theory but also on practical operating results, is in general interesting in marking a new epoch in sewage treatment.

The general design and features of the plant will be described in a future issue.

PENNSYLVANIA TRACTION ENGINE REGULATIONS.

On May 13th representatives of the State Highway Department and manufacturers of traction engines and tractors held a conference and agreed on amendments to the traction engine bill aimed to protect the highways from destruction by traction engines. The spokesman for the manufacturers, A. B. Farquhar, of York, Pa., agreed that the manufacturers should not build engines that would damage the roads that the state is building. He said: "Personally I would rather stop manufacturing tractors than be responsible for the tearing up of the thoroughfares this state needs so badly. Your state highway department should have the authority to protect the roads, and there is no denying the fact that narrow tires and narrow cleats cut the road surface." It was finally unanimously agreed that the provisions of the traction engine bill should be amended so as to provide for the examination by the highway department of all traction equipment for which a state license shall be asked, such engines as do not conform to the regulations being denied a license. Also that there should be a penalty against the operator of any tractor engine not complying with the regulations of $25 for the first offense,

$50 for the second and $100 and imprisonment for the third. It was also agreed that the highway department and the manufacturers should jointly conduct experiments and make investigations to determine the effect of the operation of tractors bearing cleats and that if necessary, such further restrictions will be placed as may be necessary to prevent damage to improved roads from the use of cleats.

ACID TREATMENT OF SEWAGE.

Deoxygenating Effect, Comparison with Imhoff and Activated Sludge, and Other Features Discussed by E. S. Dorr, R. S. Weston and H. W. Clark.

Last October, Professor C. E. A. Winslow read before the American Society for Municipal Improvements a paper describing experiments made at New Haven with the Miles acid treatment of sewage; which paper was published in Municipal Journal for October 12, 19 and 26. The engineers most influential in bringing this method of treatment into prominence were Edgar S. Dorr and Robert Spurr Weston, both of Boston, whose experiments were referred to by Professor Winslow in his paper. These engineers presented a paper before the Boston Society of Civil Engineers which is published in the April issue of the Journal of that society, in which they give the history of the Miles acid process and the experiments that have been made upon it, crediting Professor Winslow's paper with being "an eminently fair report of the results of a thorough investigation."

One of the disadvantages of the treatment suggested by the New Haven experiments was the amount of sulphur dioxide present in the effluent and its deoxygenating effect on diluting water. Messrs. Dorr and Weston believe that, if it were thought necessary, "a sufficient degree of re-aeration could be secured by discharging the effluent over a series of riffles or, if that plan were impracticable, by pumping the effluent through a suitable aerator, in the latter case at a cost of less than one dollar per million gallons. Fish life could hardly be affected, for the only place where fish could get any considerable depth of deoxygenated water would be close to the outlet. Elsewhere they would not be affected unless they swam on the surface, which fish would not do ordinarily." However, they do not think aeration would be necessary in most cases, since the effluent would be warm and practically sterile and free from sludge-forming suspended matter but, when discharged into a considerable body of water, would rise to the surface and spread in a thin layer, where it would rapidly be reaerted by the effect of wind, currents, passing craft, etc.

Comparing this treatment with the Imhoff tank and activated sludge processes, the authors state that the sludge from the Miles process contains much less moisture than activated sludge and about the same as subsiding basin sludge and Imhoff tank sludge. The relative volumes of the several sludges containing the same amounts of dry matter, taking the amount of activated sludge as 100, would be 18 for subsiding basin sludge, 15 for Miles process sludge, and 13.6 for Imhoff tank sludge. "As compared with activated sludge, the advantage of handling less than one-seventh of the volume of activated sludge is obvious."

Concerning the cost of a plant for carrying out the Miles process, the authors state that the devices required include those for producing sulphur dioxide gas and for feeding niter cake or other forms of acid, subsiding basins, sludge-handling apparatus, sludge dryers, grease extractors, grease stills, and tankage dryers and grinders. "While the list is formidable and is enough to rule out the process for small plants, in the case of a city like Boston, however, the cost should not exceed $15,000 per million gallons daily capacity."

The authors end their paper with a number of conclusions from the various experiments and studies which have been made, these conclusions being as follows:

(1) The Miles process will produce a well disinfected effluent from which 90 per cent of the settleable solids have been removed.

(2) Whereas it requires for its accomplishment devices for the chemical treatment of the sewage and for drying and degreasing the sludge, competent supervision is necessary.

(3) On account of the nature of the plant and the relatively high cost of operation for small installations, it is not well adapted for the purification of small volumes of sewage.

(4) Its operation should cause no local nuisances.

(5) It causes the removal of over 99 per cent of the bacteria.

(6) The effluent remains stable long enough for the neutralization of the excess acid, and the oxidization of the sulphites and the sulphates by dilution.

(7) As compared with the activated sludge process, the volume of sludge is very small.

(8) Compared with the cost of the oxidation processes, the cost of installation is low; it is somewhat higher than that for Imhoff tanks with chlorination.

(9) The products recovered are valuable, and their recovery would effect a conservation of natural resources.

(10) Apparently it is the most economical process for producing so well clarified and so stable an effluent, and under present conditions it seems as if it could be installed and operated at a profit in those larger cities where the conditions are favorable.

(11) To determine the costs of sludge drying and degreasing more accurately than is possible from the available data, a large-scale experiment is urgently needed.

In the discussion of this paper, Harry W. Clark, chief chemist of the Massachusetts State Department of Health, expressed his opinion that the process could not be made a financial success, citing as his chief argument the fact that the manufacturers of Lawrence, who discharge into the Merrimac river many thousand gallons daily of very strong wool liquor which contains two hundred times as much grease to the gallon as Boston sewage and a very high percentage of potash, have not found it desirable to endeavor to recover the grease from any but the strongest liquor, but continue to discharge into the river large quantities of wool liquor containing much more fat than is found in domestic sewage. Moreover, that the plants which are treating the strongest liquor would not have been started except for the scarcity of grease due to the war.

Replying to this, Mr. Weston said: "It is a well-known fact that wool-scouring wastes can be treated with acid and practically 99 per cent of the grease removed, and all plants which have used this process during the war have been immensely profitable. I personally know this is true. But the plants in Lawrence (and I say this because we have designed one of them) are all centrifugal-machine plants; that is, plants in which the wool scouring wastes are treated by passing them, after a subsidence, through a special centrifugal machine, which does not remove over 60 per cent of the fats from the stronger wool-scouring wastes. This probably explains why the strongest wastes are used, because if one should take the weak wool-scouring wastes from certain Lawrence mills containing the effluent from the third and fourth bowls, the results would be disappointing and not profitable."

COUNTY HIGHWAY DATA.

Supplementary to Tables Published in the Issue of April 19 from Information Furnished Since Then—Work Contemplated, Wages, Results of Heavy Traffic, Bridge Failures and Pavement Guarantees.

CONTRACT WORK.

State and County.	Form of contract that is favored.	In there abundance of unskilled labor in county?	Wages paid this year.	Wages prior to 1917.
Florida:				
Orange	Straight contract.	No.	$2.50 to $3.	$2.
Indiana:				
Adams	Straight contract.	Yes.	25c.	About 17½c.
Iowa:				
Clayton	Contract, county furnishing material, or by day labor.	Yes.	30c to 40c.	25c to 30c.
Kansas:				
Sumner	Straight contract.	Plenty at present.	40c.	20c.
Kentucky:				
Woodford	Straight contract or force account conditionally.	No.	$2.50 to $3.	$1 to $2.
Michigan:				
Genesee	Straight contract; also by day labor.	No.	40c.	35c.
Missouri:				
Lawrence	On bridges, straight contract; on roads, day labor proved best.	Just about enough.	20c to 30c.	15c.
Montana:				
Madison	Personally prefer contract work, but policy of county commissioners is county force, because of owning machinery.	Nominal supply.	$3.50 to $4 for 8 hours.	$3 to $3.50.
New York:				
Chautauqua	Straight contract.	No.	$3.50.	$1.75 to $2.25.
Oswego	Day labor under competen superintendent.	Sufficient.	30c.	25c.
Oklahoma:				
Okmulgee	Contract, county furnishing material.	Yes.	40c.	30c.
South Carolina:				
Kershaw	Day labor.	No.	$45 per mo.	$20 per mo.
Texas:				
Carson	Contract work.	No.	....	....
Hansford	Straight contract, but conditions compel part of work done by day labor.	No.	$3 to $3.50.	$2 to $2.50.
Hemphill	Regular contract.	Sufficient.	$3 to $4.	$2.50 to $3.
Washington:				
Benton	Straight contract.	No.	$3.50 to $4.	$2.25 to $2.50.
West Virginia:				
Kanawha	Straight contract first, or work by county. Cost plus entirely unsatisfactory.	Yes.	$3.50.	$2.50.
Wisconsin:				
Buffalo	Straight contract for big jobs; day labor for small jobs.	No.	35c.	About 20c.
Iron	Straight contract or day labor.	No.	30c.	35c.

BRIDGE FAILURES.

State and County.	Number of bridges on county roads.	Have any broken because too light for traffic?	How many are considered unsafe for the heaviest traffic?
Florida:			
Orange	10 or 12 small ones.	No.	None yet, but some soon
Indiana:			
Adams	3 new ones.	No.	None.
Iowa:			
Clayton	500 to 600.	Yes.	50%
Kansas:			
Sumner	300 large ones.	No.	30
Kentucky:			
Woodford	.....	No.	....
Michigan:			
Genesee	2	No.	None.
Missouri:			
Lawrence	23	No.	4
Montana:			
Madison	16 over rivers, no record of small ones.	No.	9
New York:			
Chautauqua	Do not know.	No.	40%
Oswego	500	No.	25
Oklahoma:			
Okmulgee	138	No.	None.
South Carolina:			
Kershaw	About 65.	Only flooring.	Nearly all.
Texas:			
Carson	No bridges.	....	....
Hansford	4	No.	None.
Hemphill	4	No.	....
Washington:			
Benton	6	No.	None.
West Virginia:			
Kanawha	100	No.	None.
Wisconsin:			
Buffalo	.....	No.	Older type not very strong.
Iron	14 on Federal and State aid roads.	No.	None.

PAVEMENT GUARANTEES.

State and County.	Are highway contractors required to give bonds?	Period of Guarante.	Do you consider guarantee desirable for all kinds of pavements?	If not for all, for what kinds?
Florida:				
Orange	Yes.	1 year from completion	Yes.	....
Indiana:				
Adams	Yes.	1 year.	Yes.	....
Iowa:				
Clayton	Yes, for 50% of his bid.	1 year.	No.	Concrete, brick, wood block, asphalt or bituminous surfaces.
Kansas:				
Sumner	No.	....	Depends on nature of supervision.	....
Kentucky:				
Woodford	....	....	No.	....
Michigan:				
Genesee	For asphaltic concrete.	5 years.	Yes.	....
Missouri:				
Lawrence	On bridges.	2 years	No data.	....
New York:				
Chautauqua	No.	....	No.	Brick or concrete, but with proper inspection; do not favor guarantee.
Oswego	....	....	No.	....
Oklahoma:				
Okmulgee	No.	....	No.	Rather have extra cost built into pavement.

COUNTY WORK CONTEMPLATED FOR 1919.

State and County	Kinds of surface to be constructed.	Amount	Will reinforcement be used in concrete pavements?	Distance between expansion joints.
South Carolina:				
Kershaw	....	....	Yes.	* All.
Texas:				
Hemphill	Yes.	Until work is accepted.	Yes.	....
West Virginia:				
Kanawha	Yes.	5 years	No.	Do not favor guarantee.
Florida:				
Orange	$100,000 brick roads, $25,000 clay surfacing.	$125,000	No concrete.	....
Indiana:				
Adams	45 mi. macadam.	Average, $5,800 per mi.	No.	....
Iowa:				
Clayton	Most heavy grading, about $12,000, and 3 mi. gravel surface.	....	Not yet.	....
Kansas:				
Sumner	Concrete	8.5 mi. 18 ft.	Some places.	33⅓ ft. when used.
Kentucky:				
Woodford	15 mi. reconstruction macadam, 20 mi. surface treatment, 4 small concrete bridges and maintenance.	35 mi.	....	....
Michigan:				
Genesee	30 mi. 9-ft. gravel roads, 12 mi. concrete and asphaltic concrete pavements.	42 mi.	Yes.	50 ft.
Missouri:				
Lawrence	About 30 mi. gravel hard surface roads, and regrade about 60 mi.	90 mi.	No concrete.	....
Montana:				
Madison	24 mi. grading and crushed stone surfacing, 150 mi. grading, and nominal maintenance.	24 mi. (Fed. Aid)	No concrete.	....
New York:				
Chautauqua	35 mi. macadam by county. 27 mi. concrete by state.	62 mi.	On some roads.	30 ft.
Oswego	....	$200,000	No.	30 ft.
North Carolina:				
Mitchell	$45,000 state aid, $11,000 county funds.	$56,000	....	....
Oklahoma:				
Okmulgee	3 mi. brick, 3 mi. asphaltic concrete and 2 mi. concrete.	8 mi.	No.	25 ft.
South Carolina:				
Kershaw	Repairing 10 mi. sand-clay and 150 mi. dirt road.	160 mi.	....	....
Texas:				
Carson	About 120 mi. grading.	$10,000	Only dirt roads.	....
Hansford	Dirt road graded.	20 mi.	No.	....
Hemphill	Grading and concrete culverts.	45 mi.	....	....
Washington:				
Benton	10 mi. gravel surfacing, 10 mi. gravel resurfacing.	20 mi.	No concrete.	....
West Virginia:				
Kanawha	....	$500,000 to $1,000,000	No.	End day's run.
Wisconsin:				
Buffalo	Grading and draining.	About $40,000	No pavements to be laid.	....
Iron	$40,000 grading, $20,000 gravel surface.	$60,000	No concrete roads	....

RESULTS OF HEAVY TRAFFIC.

State and County	Greatest weight of combined load and truck using highways.	Legal limit of weight.	Have any roads been damaged by heavy trucks?	What changes have been made in road construction because of heavy trucks?	Are such changes contemplated or recommended?
Florida:					
Orange	About 8 tons	None, but contemplated.	Yes.	Better foundation should be provided.	Yes.
Indiana:					
Adams	5-ton trucks	None, except when roads are soft.	Yes.	None.	Yes.
Iowa:					
Clayton	8 tons	None.	Yes, one piece of waterbound macadam has gone to pieces.	Will use only concrete, brick or wood block surface.	Yes.
Kansas:					
Sumner	10 tons	....	....	....	....
Kentucky:					
Woodford	....	500 lbs. per inch for 1st 2 inches, 400 lbs. per inch after that.	Yes.	We are surface-treating.	....
Michigan:					
Genesee	15 tons	State limitation, but not much attention paid to it.	Not materially.	None.	No.
Missouri:					
Lawrence	5 tons	None that I am aware of.	Very little.	None.	Yes, sub-grade must be made heavier.
Montana:					
Madison	8 tons	None.	No more than by ordinary traffic.	None.	For hard-surfaced roads will recommend 100% better foundation than present practice.
New York:					
Chautauqua ...	12 tons	12 tons for state roads, 8 tons for bridges.	Not to great extent on improved roads.	More durable types for main roads, increased depth of metal on secondary roads.	....
Oswego	10 tons	None.	Yes.	None, except heavier base.	Not determined.
Oklahoma:					
Okmulgee	10 tons	None.	Yes.	Increased thickness of base.	....
South Carolina:					
Kershaw	15 tons	None.	Yes.	All our bridges have been made heavier.	....
Texas:					
Carson	....	No limit.	No.	....	....
Hansford	No heavy traffic	....	....	None.	No.
Washington:					
Benton	10 tons	5-ton load.	Not much.	Using more material.	....
West Virginia:					
Kanawha	15 tons	None.	No.	Thicker concrete base.	....
Wisconsin:					
Buffalo	About 10 tons	None that I know of.	To some extent.	None.	Yes.
Iron	7 tons	....	Yes.	From earth to gravel.	....

AN UNUSUAL CONCRETE HIGHWAY BRIDGE.

By C. S. BENNETT.

A highway bridge has been built near Greenup, Ky., having a total length of two hundred feet, which is of a type not usually employed for a structure of such length on a county highway. Results, however, seem to have justified the use of this type in this particular instance.

The bridge spans a ravine and a small creek on the state highway along the Ohio river. Funds for building a structure at this point were limited, and a careful study was made of various types of structures in order to select one which would combine utility and durability at a minimum cost. A fill with a culvert was considered, as well as several types of long-span bridges, but the state highway department finally designed and decided upon this structure, which seemed to be more economical than any other.

The bridge consists of eight spans, each twenty-two feet in the clear, supported by open bents varying in height from a maximum of 35 feet from solid rock to the under side of the floor beams to a minimum of about 29 feet, although only about 15 feet of the latter extends above the ground surface. Each span consists of four girders connected by an eight-inch floor slab combined in T-beam construction. The general design was originally prepared for single-span bridges with a loading condition equivalent to a twenty-ton road roller, but the design was readily adapted to the combination of eight such spans into this single structure, special expansion joints being introduced at alternate spans, these joints extending through the hand-rail and post as well as the floor system.

The supporting structure consisted of two abutments and seven open bents, each bent consisting of two legs tied together by a cap beam at the top and a cross beam at a point eleven and a half feet below the bottom of the cap beam. Each post or leg is of rectangular section two feet by three feet and reinforced with twenty ⅜-inch square deformed rods, with quarter-inch hooping every twelve inches. The bottom of each post was carried twelve inches into the solid rock, without the use of spread-footings, and five-foot anchor rods one inch in diameter were set two feet into the bed rock.

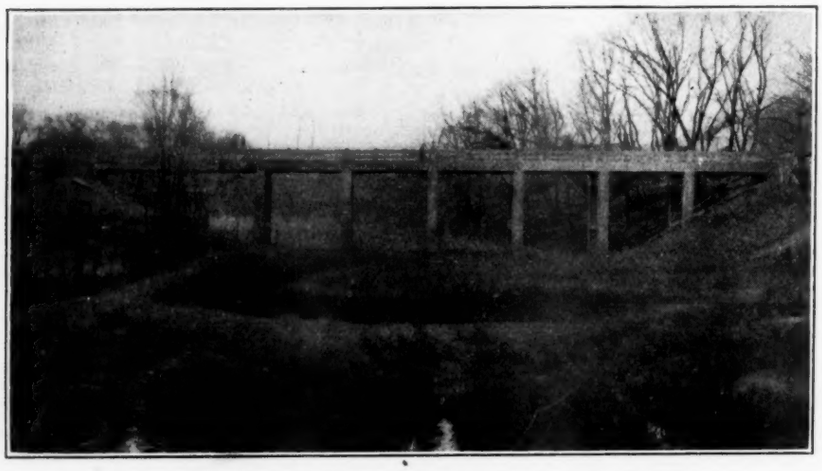
The cap beams were so designed that all of the girders carrying the floor had firm support. Expansion joints were provided between the floor beams and the cap beams. The cap beams are three feet by three and a half feet and are heavily reinforced. The cross beams are three feet by one and a half feet in section and reinforced with twelve ½-inch rods. The abutments were constructed of plain concrete and in form of the common U type.

As special forms had to be built for this structure, the work was carried ahead one span at a time, two sets of forms being used. The contractor was able to use the bents of the original structure in securing support for the forms for the superstructure. Owing to the unusual amount of steel used in the design, the forms were braced very thoroughly. Forms were built with a camber of one inch to allow for sag when the concrete was poured. The amount of sag was measured for each span and the maximum sag was ¾ inch.

After the completion of the concrete work, the roadway was surfaced with waterbound slag macadam on an earth cushion.

The quantities of material used in this bridge were: gravel, 620 tons; sand, 255 tons; cement, 509 bbls.; steel, 45,550 lbs.

The total cost of the finished structure was $7,420, including the surfacing of the roadway. The bridge was built by Burgess Brothers, of Scottsville, Va., under direction of the Department of Public Roads of Kentucky. The writer was resident engineer for the State.



TOWN BRANCH BRIDGE, GREENUP COUNTY, KENTUCKY.

STREET LIGHTING IN AUSTIN.

Furnishing lighting and current for light and power in Austin, Tex., are a function of the Department of Water, Light and Power of that city, which department was for ten years prior to the first of this year in charge of E. C. Bartholomew. In his report for the year 1918, Mr. Bartholomew stated that, although activities in the department were somewhat curtailed by the war, there was completed early in the year an underground conduit system which cost approximately $60,000 and required almost two years' time for its construction. In this conduit system will be placed the lead cables supplying light and power to the business district, and all other electric wires, the manholes having been made large enough to accommodate transformers and distribution boxes so that ultimately not a wire of any kind will be seen above ground in this district. To complete this proposed installation will, it is estimated, cost about $50,000, and it is recommended that the installation be made gradually, beginning in 1919, in order that the cost may be felt as lightly as possible.

Only one addition was made to the street lighting system during the year, this being the placing of 52 single-light cast-iron poles on West avenue, this being in continuation of the established policy of the department to place ornamental lights on streets as they are paved, the entire cost of such installation being paid by the department. All ornamental lighting circuits are 6.6 ampere series, and are supplied by constant-current transformers placed in weather-proof stations about the city and fed from one general 2,300 volt supply circuit. The standard equipment consists of an 8x16 opal globe and a 100 c.p. lamp, with lead-covered and steel-taped No. 8 cable laid about twelve inches in the ground just outside of the curb line. The poles are placed about 90 feet apart alternately on the two sides of the street. The 52 poles and about 8,800 feet of cable in West Avenue cost $4,000.

At the end of the year the street lighting system consisted of 665 one-light ornamental metal poles (incandescent), 18 two-light metal poles (incandescent), 66 three-light ornamental poles (incandescent), 35 one-light metal poles (luminous arcs), thirty 150-foot steel towers with from three to six alternating-current arcs on each, and 151 scattered 100 c.p. series lamps on wooden poles in the residence districts. In addition there are quite a number of lamps in the various parks of the city which are placed, maintained and operated by the department entirely at its own expense. When the full street-lighting equipment is in operation it consumes approximately 200 kilowatts.

The electrical equipment comprises four units, one being a General Electric generator coupled to an Allis-Chalmers tandem, compound, condensing engine of 300 kwh capacity; the second is an Allis-Chalmers-Parsons steam turbine of 500 kwh capacity; third, an Allis-Chalmers-Parsons steam turbine of 1,000 kwh capacity; fourth, a General Electric Curtis steam turbine of 2,000 kwh capacity. This gives a total generating capacity of 3,800 kwh. Mr. Bartholomew believes that this equipment, which is all in first-class condition, will last the city of Austin twelve or fifteen years if well maintained.

METERING PRIVATE SPRINKLER SYSTEMS.

By JOHN T. BRAINARD.*

The accompanying photograph shows the system of metering water service connections used for private sprinkler systems in the city of Lancaster, Pa. The connection is made at the city main by a Smith cut, which includes a sleeve and tapping valve the size of the service required. The Water Department runs the service in to the foundation of the building, connecting this end with a standard flanged pipe.

The by-pass connection on a 6-inch service requires two pieces of 6-inch pipe 20 inches long, one 6-inch swing check-valve weighted on the clapper with 1½ pounds of lead. The by-pass consists of one ¾-inch water meter, two ¾-inch valves and one ¾-inch gate check-valve and other fittings to make up the connection. The cost of the meter and by-pass connection, including plumber and labor, was $68.90. The cost to make the Smith cut and run the direct service into the building, including all material and labor but no excavation was $170.45. The well that houses the by-pass connection, our own patent stop cover, brick, sand, cement, etc., including bricklayer and helper, amounts to $74.55. Adding 20 per cent for overhead charges, the total cost of the service was $376.68.

A service charge is made at the rate of $10 per year, whether or not any water passes through the by-pass meter. If more than 200,000 gallons of water is used for tank tests or drills, it is paid for at the rate of 5 cents per 1,000 gallons.

*Secretary of Lancaster, Pa., Department of Water.

We have found this system of a fire line connection to prove very satisfactory to both the consumer and the city and accepted by the Fire Underwriters' Association.

The above kind of service was given an accurate test on a 10-inch fire line connection into one of our largest manufacturing plants, a 1-inch by-pass meter being used. Upon one of our regular monthly readings of all fire line meters we noticed that this meter showed an increase in consumption, the factory was notified and they immediately got in touch with their inspector. The leak was located in the yard system. The inspector made calibration tests and found a leak of 3 gallons per minute, which was causing the 1-inch by-pass meter to register 180 cubic feet every 24 hours.

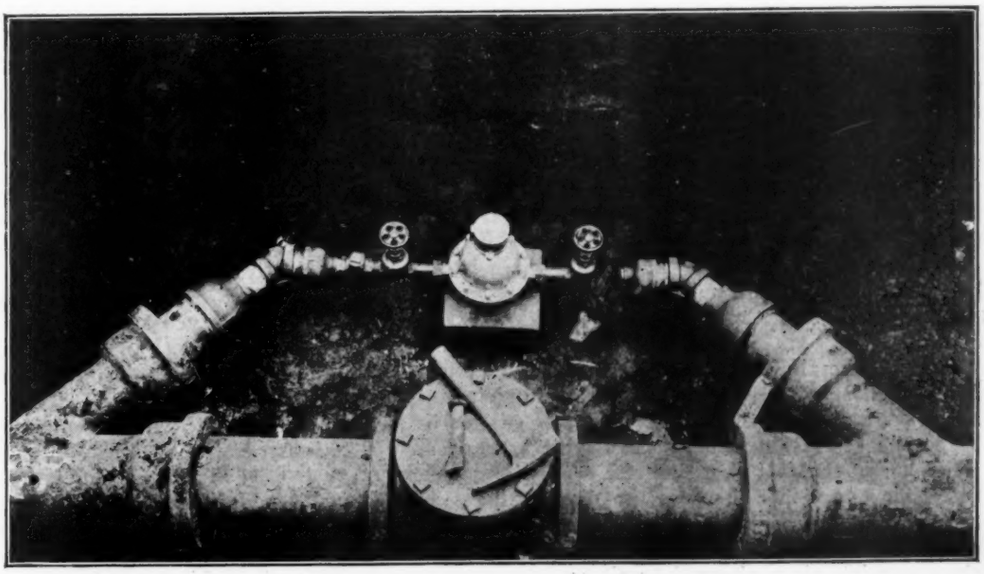
The city has installed so far 57 by-pass connections for sprinkler systems, and many of them have been tried out on fires that have occurred in the buildings with the most satisfactory results.

THE COLUMBUS REDUCTION PLANT.

The superintendent of the muncipal reduction plant of Columbus, Ohio, Thomas D. Banks, in his report for 1918, says that "the operation of the plant was affected by abnormal conditions due to the war, the worst condition being the reduction in raw material. In addition to the loss of tonnage caused by conservation, it is apparent that a large quantity of garbage is being hauled out of the city by individuals who feed it to hogs. This is contrary to city ordinance and a campaign should be inaugurated to stop the practice. Such a campaign should be well planned and sufficient attention given to it to insure its success. The plant can handle a considerable increase in tonnage with very little additional total cost."

The amount of garbage received per month varied from a minimum of 1,058.34 tons in January to 1,694.80 in August; the daily average being 39.19 tons and 62.77 tons, respectively, with an average for the year of 49.93 tons. The population is estimated at 220,000, giving 138.44 pounds per capita for the year. The total shows a decrease of 9 per cent from that for 1917, in spite of the increase in population.

The total amount of grease produced was 676,407



LAYOUT OF BY-PASS CONNECTION TO SPRINKLER SYSTEM FOR MEASURING LEAKAGE THAT DOES NOT INTERRUPT THE FLOW

pounds, or 43.28 pounds per ton of garbage, which brought $79,492.45. The tankage totaled 1,603.30 tons, or 205.16 pounds per ton of garbage, and sold for $31,707.60. In addition, $877.55 was received for hides and $210.74 for miscellaneous items, giving the total receipts, $112,288.34.

The cost of operation was $85,620.90, this including supervision, labor, fuel, motor vehicle supplies, chemical supplies, telephone, insurance, light and power, maintenance of buildings, of railway tracks and of equipment, and all other charges except interest and depreciation and an allowance for taxes. This shows a gross profit of $26,667 to cover these fixed charges.

There were 6,427 tons of coal used, or 0.4112 tons per ton of garbage, and 9.877 k.w.h., and 1,664 gallons of gasoline per ton of garbage.

An average of the analyses of the tankage throughout the year was as follows: Moisture, 3.39 per cent; ammonia, 3.77 per cent; potash, 1.08 per cent; B. P. L., 7.94 per cent. The grease analyses average: Moisture, 1.96 per cent; impurities, 0.55 per cent; unsaponifiable, 4.57 per cent.

OWNERSHIP OR CONTROL OF UTILITIES.

Advantages and Disadvantages of Each Discussed by One Who Has Had Twenty-two Years Experience as Head of a Municipal Plant.

"Public ownership of public-serving utilities is truly a splendid ideal. Theoretically it stands high on the side of right. And by the same token, conditions must be first made right for it, or it cannot stand."

The above is quoted from a letter written by one who has, perhaps, occupied the most prominent place in municipal ownership during the past twenty years—Albert E. Winchester. Mr. Winchester has for twenty-two years been general superintendent of the South Norwalk (Connecticut) electric works, and was a member of a commission appointed by the National Civic Federation in 1905 to investigate the subject of municipal ownership. The South Norwalk plant, which was designed by him as well as having been in his charge during its entire existence, has paid, out of the profits from its commercial business, the entire cost of construction, including interest and capital of the original bond issue, has furnished light and power service to the municipality without any profit, presented the city with the street-lighting system described in Municipal Journal and Public Works a few weeks ago, has loaned money to the municipality without interest, and now has a reserve fund of nearly $16,000 and not a cent of debt, and is possessed of a plant representing an investment of over $225,000. While attaining this favorable financial condition, its rates having always been and are, it is said, the lowest in that part of the country, and are only about two-thirds high as those previously paid to a private company.

Reading the above, it would be natural to assume that Mr. Winchester is a strong advocate of municipal ownership. As a matter of fact, however, this cannot be said to be the case. He is neither an advocate nor an opponent, and the fact that, in spite of his long and most favorable experience, he sees the disadvantages as well as advantages of such ownership, would seem to give his opinions on the subject the greatest weight. Continuing the quotation given above, he writes:

"Public ownership has done well in Europe; but the variedly more or less centralized scheme of control and supervision in those countries is in contrast to our American ways. We are not so careful here to make the fact effective that there is only one way to do business successfully and well. We are the most competent people in the world to promote and carry on big affairs under private management and capitalization, but when it comes to the long test of enduring publicly owned and operated commercialized industrial and utility undertakings, we find ourselves wanting in some capacity that is hard to point out. We do not lack patriotism; our civic pride is on a par with the best; but we do not educate men to do public and civic work with the same purpose and determination to win as we do for private service. We appoint, but seldom select, men for public duty. Appointees are not considered from the standpoint of experience and fitness for good business and success, but too often for political desirability and party victory for the time being. That sort of thing is fatal to any good thing of constant requirement, and it is a wonder that we are not less successful than we are in handling our public affairs. Perhaps the reason is that we have no contrasting comparison between how our public affairs would be managed under enduring methods as employed in the conduct of our great privately owned industries. We can thank God that we are Americans and we can love American ways of doing things, for they are by a long measure better as a whole than the ways of others. But, good as they are, our American ways are rather too undeveloped as yet in some parts for us to run chances with them. We must have a care and not feel too sure that, because we are so capable in most pursuits, we are able to do anything without preparation.

"As for public ownership, our government has shown us what it could do under a condition of the greatest unified support and sympathy that it could be given. We all stood with it to a man, it had all the power that could be concentrated in it and was financed without stint to the limits of our wealth. And what have we today? Consider this from the point of good service, public and commercial progress and economy, public comfort and necessity, and see how it compares with other times when our government controlled but did not attempt to manage."

Writing elsewhere, Mr. Winchester has said that municipal ownership is a strictly business proposition and is more open to failure than any other form of public undertaking because the public is not always wise in selecting its business managers from among men noted for the highest integrity combined with business capacity, and keeping them on the job as long as they make good. It is a far greater responsibility and much more difficult to keep publicly owned utilities safe for the public than to properly control private interests of the same kind and make them fulfill their obligations. If the public is not able to exercise the proper degree of determination in getting from private companies what it is justly entitled to, it may not be capable of assuming the entire burden and conflicting obligations of being both the served and the serving.

"Private and public ownership are simply designations; there is nothing in a name that guarantees success. In either case, with politics out and clean, able management, with all methods, transactions and operations always open to the public, it matters very little what be the ownership. If the public insists upon this and safeguards its servants with equal justice, and keeps at it without let-up, it matters very little what may be the ownership; the public will be well served, either way. Keeping things dark often creates unjust suspicion, which is just as bad for one kind of ownership as it is for another."

The WEEK'S NEWS

Advice of State Officials in Federal Aid Road Program—Toll Roads in Pennsylvania—Illinois May Manufacture Road Materials—States Help U. S. in Venereal Disease Fight—Typhoid Vaccination in Army—Savannah Water Supply Improved—Filtration Proposed in Sacramento—Electric Light and Power Industry in U. S.—Lansing Owns Electric Plant—Seattle Takes Over Street Car Lines.

ROADS AND PAVEMENTS

State Representatives to Advise in Federal Aid Work.

Washington, D. C.—To bring about the most effective co-operation between the federal and state governments in the big program of highway construction now under way, A. R. Hirst, president of the American Association of State Highway Officials, has named, at the request of the Secretary of Agriculture a committee to act with the Department of Agriculture's Bureau of Public Roads in carrying into effect the federal aid road act and its amendments. Following are the state representatives selected by Mr. Hirst: George P. Coleman, state highway commissioner of Virginia; S. E. Bradt, state superintendent of highways of Illinois; Charles J. Bennett, state highway commissioner of Connecticut; W. S. Keller, state highway engineer of Alabama; and Ira R. Browning, state road engineer of Utah. Stimulated by recent liberal amendments and added appropriations to the original federal aid road act, road-building plans in the states have received tremendous impetus. Many of the states have provided, by large bond issues and otherwise, amounts much larger than will be required to match the federal appropriations. Up to May of this year, 1,057 project statements for federal aid roads had been approved by the Secretary of Agriculture. They involve the improvement of 10,580 miles of roads at an estimated cost of $92,933,121.81, of which the federal aid requested was $36,576,857.48. The amount of federal funds available on March 1 for road building was more than $72,900,000, which, under the law must be matched by an equal amount from the states, making a total of $145,800,000, which includes approximately $9,800,000 from federal and state sources for roads in the national forests. Funds that will become available on July 1, with equal contributions from the states, will provide an additional $198,000,000 for federal aid road work, making an aggregate sum of $343,800,000 available for the calendar year. It is expected, however, that the states will defer taking up part of the available funds until 1920. War conditions, which almost immediately followed the passage of the first federal aid act in July, 1916, brought scarcity of labor, materials and transportation, and restricted road-building projects to those absolutely essential to winning the war. Thus the road program was held back for more than a year at a time when demands for improved roads increased more rapidly than in any previous period. State and federal forces alike are working to get highway construction under way as rapidly as contracts can be let and as soon as road-building forces, somewhat disorganized during the war period, can again be placed on an efficient working basis.

To Eliminate "Maintenance" Contract Provisions.

Portland, Ore.—Because the exact legal meaning of the word "maintenance" has never been established, contractors who have laid pavements on some 163 streets of the city have been able to collect thousands of dollars from the city on maintenance claims, although the streets legally "maintained" may have to be entirely repaved when taken over by the city at the end of the ten-year term of maintenance stipulated in the contract. Commissioner Barbur arranged to take over quite a number of these claims last year, thereby saving the city considerable money and is now making negotiations towards the settlement of the sixty or more claims still open and unpaid by the city. Until five years ago all contracts let by the city included provisions that contractors should maintain the streets they had paved for a period of ten years at a cost of 2½ cents a square yard. With no exact definition of the word maintain, these so-called claims for maintenance were "pure velvet" to the contractors, according to commissioner Barbur. This provision has been eliminated from all contracts on street improvements at present, as the city is able to keep up the maintenance much cheaper than the contractors, because of the city paving plant.

Freeing Pennsylvania's Toll Roads.

Harrisburg, Pa.—With the aid of the counties, the commonwealth of Pennsylvania during the next two years may be able to remove from the state's highway system the last of the toll gates. With county aid, the commonwealth since 1913 has eliminated toll gates from 364.57 miles of state highway. The total cost was $1,321,119.57. During the two-year period beginning June 1, the state will have $500,000 available for purchase of toll roads on the state highway system. There are 178 miles of such roads. Toll roads on the state's system are found in counties in the southeastern section of the state, except for a six-mile turnpike in Cambria and Indiana counties. Mileage in the various counties is as follows: Lancaster, 36; York, 15; Adams, 12½; Bucks, 41½; Montgomery, 56¾; Delaware, 6; Berks, 4; Cambria, 4; Indiana, 2. The total approximates 177¾ miles.

Advises State to Manufacture Road Material.

Springfield, Ill.—Manufacture by the state of materials needed in making public improvements, including the building of roads, and study of the advisability of amending present laws to permit the use of patented materials are included in recommendations of the special legislative committee named by the legislature to investigate prices of building materials. The report of the committee, of which Senator John Dailey, of Peoria, is chairman, also urges the passage by the general assembly of a state forestry law, and memorialization of congress to present the need of a federal forestry policy. Such a program is declared to be necessary in order to conserve state and national timber supplies. No positive evidence was discovered by the committee to indicate that prices were established by combination of dealers in building materials. "The circumstances, however, indicate," the report says, "that cement prices are fixed by agreement." The report found the average total cost of manufacturing cement, including packing and administration, would be $1.25 a barrel. The inquiry of the committee was confined largely to the so-called basic materials—brick, cement and lumber, although some attention was given to sand, gravel and stone. In a special recommendation to the public, the report urges immediate building and expressed the belief that prices on building materials will not soon be much reduced.

"In view of our opinions expressed in this report, we believe it to be our duty as public officials to advise the public not to delay building projects in the hope that prices will come down materially. We do not believe they will. We deem it a part of wisdom to accept present conditions as normal and that building operations should be based upon that principle. With labor unemployed, with plants operating at great losses, owing to limited outputs, with necessary public and private improvements long delayed, there is serious danger of widespread business depression. All contemplated buildings, homes and improvements should be started now."

Discussing the recommendation that the state acquire facilities for the manufacture of building materials, the reports says:

"The direct interest of the state in a comprehensive system of road building makes it imperative that the state, as trustee for the people, should protect the public from extortionate charge for road building material. When the people voted for the $60,000,000 bond issue for hard roads it was with the express representation the road projects would not be instituted until the war was over. The overwhelming vote for hard roads was with the understanding that this work would not be commenced until prices were established and normal conditions resumed. The present unjustifiably high prices of road materials will restrict the road building program, reducing the mileage very appreciably. We believe that in view of all these circumstances the state should be authorized by law to manufacture products entering into the public improvements of the state.

"We therefore recommend to the general assembly for passage and to the governor the approval of an act enabling the state, through its department of public works and buildings, to accomplish the following:

"a—Acquire by condemnation under the eminent domain laws of the state lands, mines, quarries, mineral deposits or other property for procuring such raw materials as are necessary for the construction of public improvements.

"b—Sell and dispose of products so produced.

"d—Enter into contracts with producers and manufacturers for the supply to the state of raw materials and manufactured products necessary in the construction and maintenance of public improvements by the state.

"e—Extend credit and make loans to persons, firms or corporations to aid and assist them in producing such raw materials and manufactured products; such credit to be extended or loans made only when such persons, firms or corporations execute and furnish to the department of public works and buildings pledges, promises and guarantees sufficient to secure the state on account of such loans made or credit extended."

In explanation of the statement that no positive evidence was present to show combination of cement manufacturers to fix prices, although circumstances indicated that an understanding existed, the report says:

"Our basis for this conclusion is that different companies make exactly or approximately the same bids for the same work. As an illustration the Atlas, Lehigh, Marquette and Universal companies recently made a price verbally to the city of Chicago and to the county of Cook of $2.05 a barrel for the city and $2.08 a barrel for the county. The identity of bids is significant that such prices were the result of agreement. The Marquette plant is located in LaSalle county, Illinois, as is one of the Lehigh plants; the Atlas plant is located at Hannibal, Missouri and the Universal plant is located at Buffing, ton, near Gary, Indiana. The freight rates from Hannibal to Chicago is 42 cents whereas the freight rates from Garry to Chicago is 19 cents. If Hannibal can furnish cement in Chicago at a profit, then the difference of 23 cents freight rate would indicate that the Gary plant is making an excessive profit at least of 23 cents a barrel on cement. Either this is true or the Hannibal plant is losing money or an agreement and understanding exists between these companies determining prices."

With reference to brick prices the report says:

"We have been informed by the brick manufacturers that brick cannot be sold for less than $12 per thousand in Chicago, delivered to the job, without depriving the manufacturers of a reasonable profit. This we are not prepared to dispute. The commission has been unable to establish by evidence that any illegal combinations exist to regulate the price of common building brick."

SEWERAGE AND SANITATION

Sue City for Odors from Sewer.

Birmingham, Ala.—Six suits have been filed in the circuit court by residents, against the city, asking damages in the amount of $30,000, it being alleged that the sewers did not function properly. The complaint stated that for several days after October 29, 1918, the sewers supposed to care for the needs of the residents signing the petition overflowed and gave forth offensive odors. This condition is alleged to have lasted until January 26, 1919, although it is alleged that the matter had been reported to the city officials, but no action was taken until January. Commissioner of health, H. P. Burruss said that the only solution to the problem would be a new system. According to a statement given out: "The sewerage trouble is one that has been felt by every city administration for the past 10 or 15 years. Each has passed the buck right along to the next administration, making such makeshift improvements as they could. One of the first actions of the present commission was to hold a conference to see what might be done to relieve the situation. January 29 the commission passed a resolution instructing the city engineer to make a survey for an adequate sewer system for the city. Doubtless, such a system will at least be begun under the present administration. Municipal improvement bonds may be issued. Last year, for the first time in the history of Birmingham, bidders for our municipal improvement bonds offered a premium on them. Only a few were sold because we needed just a small amount of money to make repairs and do small extension work. There will be no trouble in getting the necessary finances. The system of storm sewers needed will cost a large amount, running into the millions. A long time will be required to complete the work. But the present city commission will push the matter through. It may be expected that relief in the way of improvements that will last will be made."

Most States Help U. S. in Health Campaign.

Washington, D. C.—The law enforcement division of the Commission on Training Camp Activities reports that the following states have not complied with the provisions of the Chamberlain-Kahn Act by passing the necessary laws to be qualified as beneficiaries for the fiscal year 1918-1919: District of Columbia, $3,599.66; Missouri, $35,807.91; New Mexico, $3,558.70; Pennsylvania, $83,341.55; Tennessee, $23,754.87. Reports to date show that legislation on venereal disease control has been introduced in thirty-three states—Alabama, Arizona, Arkansas, California, Connecticut, Delaware, Idaho, Iowa, Kansas, Massachusetts, Michigan, Minnesota, Missouri, Nebraska Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Washington, Maine, New Hampshire, New Mexico, Wisconsin, Wyoming. If the states receive the Federal aid for the fiscal year 1919-1920, the state legislatures must grant an appropriation for the continuance and extension of venereal disease control. The necessary bills have already been passed by North Dakota for $12,548.48; Oregon, $25,000; South Carolina, $10,000; Wisconsin, $50,000; Wyoming, $4,000, and West Virginia, $7,000.

Army Typhoid Vaccination Not Properly Effective.

Washington, D. C.—Charges of carelessness and negligence in preventing the spread of typhoid and paratyphoid fevers in the army are made against many medical officers serving with the forces overseas in a circular published by the surgeon of the American Expeditionary Forces and made public here by the public health service in connection with a warning that vaccination does not give complete immunity from typhoid. The chief surgeon cites many instances where epidemics prevailed among troops, especially during the last offensives on the western front, and points out that the occurrence and distribution of diseases was constantly brought to the attention of the medical officers through weekly bulletins. "It would appear," the circular continues, "that many officers utterly failed to grasp the significance of these reports and warnings, a fact which may be due to a false sense of security under the popular belief that vaccination against typhoid and paratyphoid gives complete immunity even in the midst of gross unsanitary conditions. Notwithstanding the fact that typhoid and paratyphoid fevers are epidemic in the United States and in spite of our extensive experience with these diseases during the Spanish-American war, and later during the period of mobilization on the Mexican border, it is evident that many medical officers have gained but little knowledge of the fundamental principles underlying prevention and control. It is also quite evident that some medical officers are grossly careless and neglectful of their duties and responsibilities as medical officers and sanitarians." "It is fully recognized," the circular says, "that conditions brought about by the mobilization of millions of men and the active participation in the war of two million of these men have at times rendered sanitary control extremely difficult, especially during the stress of active combat. The high standards of sanitation and personal hygiene set by the army medical department during the previous decade, it adds, were not lived up to during the past year and a half, due to a combination of factors, the most important of which was the lack of facilities and material transportation difficulties and insufficient training and personnel." In a brief review of

the occurrence of typhoid and paratyphoid fevers in the expeditionary forces, the chief surgeon says that until June, 1918, few cases occurred and the rate was within the expected limits. From then on, however, it appears the disease spread through many units. During the Chateau-Thierry offensive, the circular discloses, approximately 75 per cent. of the troops engaged were afflicted with diarrhoeal diseases, such as simple diarrhoea, bacillar dysentery, typhoid and paratyphoid. "The high incidence of intestinal diseases in this sector," the chief surgeon says, "was due to entire disregard of the rules of sanitation." Both dysentery and typhoid-paratyphoid fevers were demonstrated to have prevailed to some extent after the St. Mihiel offensive, but the epidemics of pneumonia and influenza prevailing at that time overshadowed all other medical admissions. Following the offensive in the Argonne, typhoid and paratyphoid began to be reported from virtually all divisions engaged, and, according to the chief surgeon, it was quite evident the initial cases were due in large part to the drinking of infected water. In July, 1918, a replacement unit consisting of 248 men from Camp Cody, New Mexico, reached England with typhoid prevailing extensively; 98 men, or 39.5 per cent, had the disease, and the death rate was 8.42 per cent. From the investigation it was concluded that the men were exposed to infection through drinking water while traveling across the United States. The unit had been vaccinated a few months prior to the epidemic. The chief surgeon declares that in many instances patients, some of whom were wounded, passed successfully through camp, field, evacuation and base hospital without any documentary evidence that typhoid or paratyphoid was even suspected in their cases. In not a few cases it remained for pathologists to make a diagnosis at the autopsy table. A number of new regulations requiring all medical officers in forces overseas to report immediately even suspected cases of typhoid have been published by the chief surgeon.

WATER SUPPLY

Improving Savannah's Water Supply.

Savannah, Ga.—The signing of a contract by the mayor to install a well in the southern part of the city, that will supply three billion gallons of water per day, is the first move in the drilling of a series of wells in order to eliminate the condition of the entire water supply coming into the city through the main on the west side. The well will be sunk in Ardsley Park, and will be ready for use in six months, says mayor Stewart. It will then be connected with the Abercorn street main. This will relieve one-fourth of the city's supply coming into the city now from the west side. Since the present administration took charge three months ago, there has been steady progress in placing electric pumps on the wells. Superintendent L. A. East, of the water department, has installed equipment that will give one million gallons more per day in the west side wells. A second electric pump has been placed on the well at the Brinson Railway, 1,500,000 more gallons per day, thus being added to the capacity of the pumps. It is hoped within twelve months to have two wells of three million gallons capacity each, on the east side and four of one and a half million gallons capacity on the west side, in operation by electric pumps. This will enable the city to shut down the present steam plants. The saving in cost of operation of these pumps will, it is estimated, pay for the new plants in two or three years.

Commission Has No Power Over Franchise Rates.

Seymour, Ind.—John H. Edwards, of Mitchell, serving as special judge in an injunction proceeding filed by the Seymour Water Company against the Indiana public service commission in an effort to prevent the enforcement of lower rates in this city, has ruled that the commission has no authority to alter or modify existing rate schedules in Seymour, as they were fixed in a franchise granted to the city prior to the creation of the commission. The commission recently ordered a 10 per cent. discount on all bills, including municipal water rentals, which were paid within ten days after they became due. The company insists that the appraisement of its property is too low and is unjust. The case has been fought through the courts for the last four years and while no action was taken, it is generally understood that the state will appeal the case to the Indiana supreme court, as the effects of the decision by Judge Edwards is far reaching. When the ruling of the commission was announced, the local water company obtained a temporary injunction against its enforcement and the discount has never been given. The commission was represented by Ele Stansbury, attorney-general of Indiana. O. H. Montgomery, of this city, represented the water company, and John M. Lewis, of Seymour, represented the city of Seymour as an interested third party to the suit. The Seymour Water Company had not surrendered its franchise. Early in the life of the public service commission the company brought an action in the federal court to restrain the commission from regulating water rates on the ground that to do so would abrogate a franchise contract with the city of Seymour. A constitutional question was involved in this proceeding. The federal court held the public service commission had jurisdiction. Then the commission went ahead and fixed water rates for Seymour.

To Vote on $2,400,000 Filtration Plant Bonds.

Sacramento, Cal.—The city commissioners have ordered that the proposition of voting $2,400,000 in bonds to install a filtration system to provide the city with clear water from the Sacramento River be submitted to the people for approval at an election to be held not later than two weeks after the general city election which fell on May 17. The subject was brought before the commission by George Maddock, chairman of the water committee of the Chamber of Commerce, who said the committee approved the report of engineer C. E. Grunsky favoring filtration and recommended that an election be held and follow Grunsky's suggestion that a bond issue of $2,400,000 be voted. The Chamber of Commerce Committee, in recommending Grunsky's report, claims that the following steps should be taken:

1. That steps should be taken to bond the city to the extent of $2,400,000 for the purchase of a site and the erection thereon of a pumping and filtration plant, and that the water be drawn not only from a hollow tower or pier, but also by means of a caisson whose lower edge would reach some forty or fifty feet below the low water mark of the river. The caisson system would have the advantage of getting water that is naturally filtered on the bed of the river.
2. That investigations be continued as to the well-water supply that could be obtained from wells sunk east of the city.
3. That negotiations be opened at once with the Oak Park Water Company for the acquisition of their properties to be used as a stand-by in case the filtration plant was out of commission temporarily.

Water Supply Found Satisfactory.

Oswego, N. Y.—That Oswego's water supply is satisfactory is the announcement received from the state board of health, in which a report is made of an inspection of the city supply by assistant engineer Earl Devendorf. The report shows that the department uses the liquid chlorine method of sterilization as recommended by the board, using eight pounds of chlorine a day, which is applied to the raw water in the suction well of the pumps. This is at the rate of about 0.17 parts per million by weight. The chlorine apparatus, it is stated, is at all times carefully operated under analytical control and, the department as a further safeguard of its supply, the report says, has installed double check valves on supplies from the Oswego river, which several industrial plants use as fire supplies. "At the time of the inspection samples of water were collected and the results of these analyses show a water slightly colored and turbid and hard," the report goes on. "The figures for nitrogen in its various forms, for oxygen consumed and for chlorine, compare closely with those usually obtained in analyses of Lake Ontario water. The total bacterial counts in the chlorinated water are low and the absence of organisms of the B. coli type indicate that the treated supply was free from active contamination at the time of the inspection. In view of the above facts

the following conclusions may be drawn: 1. That the public water supply of the city of Oswego, although somewhat hard, is of reasonably satisfactory physical quality. 2. That although the location of the point of intake is such that a raw water of fairly satisfactory sanitary quality is obtained, the ever-present possibility of contamination from lake steamers, from shore wash or from the Oswego river reaching the water in the vicinity of the intake renders it essential that efficient sterilization of the supply be carried on at all times. 3. That the amount of chlorine being applied at the time of the inspection appeared to be too close to the minimum amount capable of giving uniformly effective sterilization to assure adequate protection to the sanitary quality of the supply. I would, therefore, recommend: 1. That the city authorities continue to operate the chlorination plant effectively at all times and with regular analytical control. 2. That, consideration be given to increasing amount of chlorine applied to a minimum of 0.20 parts per million by weight and to increase this rate whenever the bacterial examination indicates the need for larger amounts of chlorine."

STREET LIGHTING AND POWER

Electric Light and Power Industry of U. S.

Washington, D. C.—According to a report by the Department of Commerce, the electric light and power stations in the United States during the year 1917 generated more than 25,000,000,000 kilowatt hours of electric energy, producing an income of more than a half billion dollars, and gave employment to more than 100,000 persons, whose salaries and wages aggregated nearly $100,000,000. The output in 1917 was more than double that for 1912 and more than quadruple the output for 1907. The report covers both commercial and municipal plants, but does not cover electric plants operated by factories, hotels, etc., which generate current for their own consumption, plants operated by the federal government and state institutions, nor plants that were idle or in course of construction. The figures show great strides in the industry during both of the five-year periods, 1907-1912 and 1912-1917. The output of electric energy by the light and power stations increased at a considerably greater rate and their expenses at a slightly greater rate than their income, and the rate of increase in the number of persons employed was much smaller, particularly during the later five-year period, than that in the amount of business done. The total number of establishments increased from 5,221 in 1912 to 6,541 in 1917, the latter comprising 4,224 commercial and 2,317 municipal establishments. The increase indicated by these figures is somewhat misleading, since 2,296 new establishments came into existence between 1912 and 1917, but as a result of combinations in the commercial systems and various other changes the net increase was only 1,320, comprising 565 commercial and 755 municipal stations. The total income of the stations in 1917, of which 95.3 per cent represented electric service, amounted to $526,886,408, an increase of 74.3 per cent as compared with 1912 and of 200 per cent as compared with 1907. The total expenses were $427,136,049, or 82.1 per cent more than in 1912 and 218.3 per cent more than in 1907. The employes of the light and power stations numbered 105,546, an increase of 33 per cent over 1912 and of 121.6 per cent over 1907, and their salaries and wages aggregated $95,239,954, an increase of 55.7 per cent as compared with 1912 and of 168.9 per cent over 1907. The total primary power in 1917 amounted to 12,857,998 horsepower, an increase of 70.8 per cent as compared with 1912 and of 213.7 per cent over 1907. Of this power nearly two-thirds—8,389,389 horsepower—was derived from steam; almost one-third—4,251,423 horsepower—from water; and the remainder—217,186 horsepower, or less than 2 per cent—from internal combustion engines. The corresponding proportions for 1912 and 1907 differed but slightly from those just stated. The average horsepower per steam engine shows a very great increase—from 334 in 1907 to 631 in 1912 and to 1,124 in 1917. The average horspower of the water wheels also shows a marked increase from census to census, but in the case of the internal combustion engines there has been a decline. The total dynamo capacity, 9,001,872 kilowatts in 1917, represents an increase of 74.3 per cent as compared with 1912 and 232.2 per cent over 1907, these rates of increase being slightly greater than the corresponding ones for total primary power. The output of electrical energy aggregated 25,438,611,417 kilowatt hours, an increase of 119.9 per cent for the period 1912-17 and of 333.9 per cent for the decade. Of the 6,541 establishments reported for 1917 those which purchased all their electric energy from other establishments numbered 1,422, as against 507 in 1912 and 227 in 1907. The figures indicate that the arc lamy for street lighting is being fast superseded by the incandescent of various types. The former class of lamps decreased in number from 348,643 in 1912 to 256,838 in 1917, the reduction amounting to more than one-fourth; while during the same period the number of incandescent lamps more than doubled, increasing from 681,957 to 1,389,382.

City to Take Over Electric Plant.

Lansing, Mich.—After lengthy litigation and also competition of many years between the city and the Michigan Power Company, a value on the company's plant has been fixed. Judge Tuttle, of the federal Eastern District court, has fixed the value of the plant at $1,124,805. This decision by the court is the result of a gentlemen's agreement between a special committee representing the city in the proposed purchase of the Michigan Power Company and David R. Thomas, receiver for the Michigan Power Company, and Mr. York, chairman of the bondholders' committee of the Michigan Power Company. Under the terms of this agreement it was understood that the plant should be appraised by experts to be picked by the court from lists submitted by the special committee and the bondholders. Appraisement was to be made on the basis of the fair, honest value to the owner, in the opinion of the appraiser, of the entire properties of the Michigan Power Company. The city reserved the right to exclude undeveloped water rights from the purchase. The appraisal was to be subject to review and approved by the court. Another provision of the agreement was that the expense of all new equipment added to the property and installed by the receiver under direction of the court was to be added to the amount of the appraisal, including the cost of the appraisement. The present mortgage on the property, it was understood by the parties, was to be foreclosed and a new company formed to take over the property. It included the placing of new bond issues secured by mortgages on the property, based upon its appraisal value as finally determined by the court, with the cost of new equipment and of the appraisement added. The parties further agreed that there should be two bond issues, the first to be called "A" bonds, to cover cost and expense of new equipment and appraisement, to mature in five years, one-fifth each year, and to bear interest at such rate as money may be procured. The second issue, or "B" bonds, was to cover the amount of the appraisal bearing interest at 5 per cent and to mature not later than 1935, with the privilege on the part of the city of retiring all or a part of the bonds at interest due date at $101. The mortgage was to contain a provision for a sinking fund each year after the first five years on "B" bonds sufficient to retire them. It was also understood that the holding company when organized and after taking over the property should turn the plant over to the city of Lansing or its authorized agent for the nominal sum of $1, subject to mortgages securing the bond issue. The figure that was fixed by the court is less than the valuation made by the appraiser for David R. Thomas, receiver for the company, but is more than the amount which the city proposed to pay. The original appraisal made by Esselstyne, Murphy & Hanford, Detroit, was attacked by the city on the ground that it was made on the basis that the company was a growing concern, when as a matter of fact the concern was in the hands of the receiver. The city also claimed that the so-called "receiver's appraisal" was excessive on real estate valuations. This appraisal amounted to $1,-

253,076; the court reduced this to 75 per cent of that value, or $939,805. To this amount was added $185,000, as the price of a new turbine which has been added.

TRAFFIC AND TRANSPORATION

Municipal Ownership Survey.

Milwaukee, Wis.—By a recent resolution, the president of the common council has appointed a committee on street railways and electric power requisition consisting of seven members, three councilmen and four others, to investigate the possibilities of municipal ownership. The committee, which may engage a paid secretary and employ experts and assistants, is to report on the following subjects, which form an outline of the survey:

1. Economies, if any, to be worked through the city ownership of properties.
   (a) Can any money be saved on street sprinkling?
   (b) Can money be saved on court and legal expenses?
   (c) Can money be saved on maintenance?
   (d) Can money be saved in salaries?
   (e) Can money be saved in the use of property; for instance, like renting out a large portion of the space in the Public Service building?
   (f) Can money be saved on snow removal?
   (g) Can money be saved on garbage collection?
   (h) Can money be saved on ash collection?
   (i) Can money be saved on rubbish disposal?
   (j) Can money be saved by joint reading of water and electric meters?
2. Can the revenues be increased under municipal ownership?
   (a) Is it not possible to increase the riding habit of the public?
   (b) Would not the hauling of freight increase the revenues?
   (c) Cannot the use of electric energy for lighting be further stimulated in Milwaukee?
3. Cannot the service problem be better worked out under municipal ownership?
   (a) Could the routing of cars be improved?
   (b) Would not the immediate acquisition of more cars increase the riding habit and in turn increase the revenues?
   (c) Would not greater willingness to make extensions of street railways and electric service lines stimulate consumption and in turn increase revenues?
4. What properties are to be acquired?
   (a) Merely the local city street car lines, or
   (b) The street car lines an delectric lighting lines within the city, or
   (c) Both of the above within the city and the interurban municipalities within the county, or the entire holdings of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, or
   (d) Some other division to be suggested by the committee.
5. Cannot the future development and the growth of the city be better worked under municipal ownership, in view of the fact that extension of lines can be along the natural arteries of travel and can be made in accordance with municipal developments and the growth of industrial activities?
6. Inquire into the recent valuation of the Railroad Commission and report upon the accuracy, fairness and completeness of the same
7. Include in the report a financial plan of acquisition and reorganization.
8. Include in the report some plan of future management determined by the committee to be feasible and preferable.
9. Are there other reasons for or against municipal ownership ?

Seattle Takes Over Its Street Cars.

Seattle, Wash.—The street railway system is now in the hands of the city, all the property bought having been transferred to the superintendent of public utilities, Thos. F. Murphine. The purchase involved the transfer of 206 miles of track, 600 cars, several car barns, repair shops, warehouses and supplies, as well as real estate. The employes, numbering 1,200 conductors and motormen, and 600 others are now employes of the city. On recommendation of superintendent Murphine, council passed an ordinance instituting a wage scale for conductors and motormen, giving $4.25 per day for the first six months, $4.50 for the second six months, and $4.75 per day thereafter. The whole operating organization of the company, from superintendent Henderson to laborers, was transferred almost intact. A. W. Leonard, president of the Puget Sound Traction, Light & Power Co., after the system was formally taken over, made the following statement: "The city can do many things for the car lines that no private company could do, and which it could not very well do, perhaps, with the lines under private management. It can lower costs of operation by freeing itself from burdensome taxation. It can borrow money for extensions and development on better terms and at lower rates of interest than the company could with so many of its franchises approaching the time of expiration. It can pay dividends to its stock holders—the public—in service instead of money. It can reduce the cost of accidents and some of the costs of accounting and legal service through the co-operation of the other city departments. It can greatly facilitate operation by securing the co-operation of the street and police departments in the regulation of traffic. The city can eliminate unfair competition and adopt practices, like the skip stop, which will effect very material savings."

LEGAL NOTES

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Retirement of Firemen.—Physical Disqualification.

(N.Y.Sup.) Under Greater New York Charter, § 790, providing that the fire commissioner shall have power to retire any member of the uniformed forces who may be found upon examination by the medical officers to be disqualified, the commissioner shall determine as a fact whether the disability exists, and, if so, whether it is total or partial, and the certificate or finding of the medical officer is not conclusive upon him.—People ex rel. Kane v. Drennan, 173 N. Y. S. 879.

Political or Quasi Corporations.—Municipal Corporations.—Distinction.

(Okla.) Cities, towns, and villages are municipal corporations proper, while counties, townships, school districts, road districts, etc., are political or quasi corporations; there being an established difference between the two classes of corporations, so that a principle applicable to one class is not necessarily applicable to the other.—Honnold v. Board of Com'rs of Carter County, 177 P. 71.

Limiting Municipal Functions.—Power to Build Ice Plant.

(Wash.) Any doubt as to proprietary powers of municipal corporation must be resolved against it; the policy of the law being to limit rather than to extend such functions.—State v. Port of Seattle, 177 P. 671.

Under Laws 1917, p. 498, §1, port of Seattle had no authority to build ice-manufacturing and cold storage plant as incident to its business of warehousing largely in excess of needs of such business, and thereafter to sell ice to others engaged at retail in selling ice.—Id.

Unreasonable Exercise of Power—Act of General Assembly.

(Ill.) Where legislative power is delegated to the General Assembly to municipalities in general terms, it is implied that the power shall be reasonably exercised, and citizens will be protected by courts against an illegal, unreasonable, or oppressive exercise of the power.—Catholic Bishop of Chicago v. Village of Palos Park, 121 N. E. 561.

An ordinance passed pursuant to express power granted by General Assembly is regarded as an act of the General Assembly itself and cannot be set aside by courts on ground that it is unreasonable.—Id.

Counties May Not Issue Bonds for Dirt Roads.

Austin, Tex.—Commissioners' courts have no authority to issue bonds to construct "dirt roads" under Chapter 2, Title 18, R. S. 1911, according to the opinion of the attorney general. The opinion holds that counties are authorized to take over bonded debts of road districts therein, to issue bonds to pay for district roads constructed and to further construct roads to the end that district roads may be connected up and merged into a general county system. Another opinion holds that expense of changing a roadway because of levee construction may be borne by the county, but if the commissioners' court refuses to bear this expense it devolves upon the levee district. A third opinion holds that the commissioners' court may, with the consent of the city, pave the courthouse square and streets leading thereto and connecting with county public roads.

NEWS OF THE SOCIETIES

June 9-13.—AMERICAN WATER WORKS ASSOCIATION. Thirty-ninth annual convention, Iroquois Hotel, Buffalo, N. Y. Secretary, J. M. Diven, 47 State street, Troy, N. Y.

June 17-19.—TRI-STATE WATER AND LIGHT ASSOCIATION OF CAROLINAS AND GEORGIA. Ninth annual convention, Greenworth, S. C. Secretary treasurer, W. F. Stieglitz, Columbia, S. C.

June 17-20.—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting, St. Paul-Minneapolis. Secretary, Charles W. Hunt, 33 W. 39th St., New York, N. Y.

June 23-26. — SOUTHWESTERN WATER WORKS ASSOCIATION. Annual convention, Coates House, Kansas City, Mo. Secretary, E. L. Fulkerson, 617 Washington St., Waco, Tex.

June 24-27.—AMERICAN SOCIETY FOR TESTING MATERIALS. Twenty-second annual meeting, Hotel Traymore, Atlantic City, N. J. Secretary, University of Pennsylvania.

June 24-27.—INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS. Annual convention, Kansas City, Mo. Secretary, Gen. Fire Marshal James McFall, Emergency Fleet Corporation, U. S. Shipping Board, Philadelphia, Pa.

Aug. 26-28.—LEAGUE OF CITIES OF THE THIRD CLASS IN PENNSYLVANIA. Twentieth annual convention, Allentown, Pa. Secretary, Fred H. Gates, city clerk, Wilkes-Barre, Pa.

Oct. 27-30.—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting, New Orleans, La. Secretary, A. W. Hedrich, 169 Massachusetts ave., Boston, Mass.

Nov. 12-14.—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, Springfield, Ill.

American Water Works Association.

The thirty-ninth annual convention of the American Water Works Association will be held June 9-13 in Buffalo, N. Y., with headquarters at the Iroquois Hotel.

The first day will be devoted to registration, to meetings of the executive and other committees and in the evening to a reception and dance tendered by the Water Works Manufacturers' Association.

The convention will be opened on Tuesday morning with an address of welcome by A. W. Kreinheder, commissioner of public works of Buffalo. John E. Teeple and John A. Kienle will then present a paper on "The Relation of the Chemical Industry of Niagara Falls to the Waterworks." There will follow a round-table discussion on "Damage to Fire Hydrants by Motor Vehicles and Remedies Therefor," the suggestions being (a) moving hydrants from the curb back to the building line; (b) substituting flush hydrants for the post style hydrant; (c) placing post fenders around hydrants; (d) making no change in previous practice as to location of hydrants, but repairing broken hydrants at minimum cost by welding stand pipes. In this connection, information and suggestions as to practice are requested from members.

At the afternoon session will be presented the report of the committee on "Private Fire Protection Service," by Nicholas S. Hill, Jr., chairman. This will be a final report, and very important and complete. The Question Box will be opened after the report is completed.

At the evening session the following papers will be read on the Buffalo water supply, illustrated by lantern slides: "Buffalo Water Supply with Special Reference to the Filtration Problem" and "Reduction of Water Consumption by Means of Survey and Constant Inspection." There will also be a paper on "The Uniflow Pumping Engine," by D. A. Decrow. The Water Works Manufacturers' Association has arranged a theatre party for the ladies for this evening.

The Wednesday morning session will be devoted to a discussion of prices and to a business meeting. There will be a series of papers by U. S. Government officials and manufacturers on "The Trend of Prices." The president of the association will deliver his address and the treasurer, secretary, and committees will report. The 1920 convention place will be selected and candidates for the nomination committee nominated.

At the afternoon session William J. Orchard will read a paper on "Purification of Water for the Army and Field Purification Plants" and John Oliphant will discuss the subject "Air Lift and Water Purification." At 3 p. m. autos provided for the occasion will take the members for a trip to the Buffalo water works pumping station.

The evening will be devoted to a card party for the ladies, prizes being furnished by the Water Works Manufacturers' Association. This association will also entertain the members at a smoker in the Hotel Statler.

At the Thursday morning session Leonard Metcalf will read a paper on "The Effect of the War Period, 1914-18, and Public Control Upon Water Works of the United States." Other papers on this subject, showing the effect of the war on operating costs, will be read.

Thursday afternoon will be devoted to a trip to Niagara Falls, the manufacturers supplying the tickets.

On Friday there will be an informal "get-together" session, at which members will give informal talks on "Personal War Experiences."

A golf tournament will be held during the convention, the manufacturers furnishing the prizes. There will also

(*Continued on page 378*)

PROBLEMS CITIES ARE STUDYING
WITH EXPERTS

Cameron Parish Road Districts No. 3. 4 and 5, Cameron, La., will sell $390,000 bonds for HIGHWAY CONSTRUCTION. The consulting engineer is T. H. Mandell.

Cedar Rapids, Ia., will advertise for bids in July for the construction of a concrete BRIDGE to cost $250,000. The consulting engineers are the Marsh Engineering Co.

Osage, Ia., is to build a SEWERAGE SYSTEM to cost from $175,000 to $200,000, according to plans prepared by the consulting engineering firm, the Charles L. Pillsbury Co.

Somerton, Ariz., is to build WATERWORKS and SEWERAGE SYSTEMS to cost $70,000 and $30,000 respectively. Plans are being prepared by the consulting engineers, Olmsted & Gillelen.

WATERWORKS IMPROVEMENTS, including a reservoir and pressure tank, are to be made by the city of Albert Lea., Minn., according to plans prepared by the consulting engineer, J. H. A. Brahtz.

Whittier, Cal., is having plans prepared for extension and improvements to WATER SYSTEM, including developing new supply and increasing storage facilities, to cost about $300,000. The consulting engineer is J. B. Lippincott.

Aberdeen, S. D., is to build stormwater SEWERS, for which $350,000 will be voted. Preliminary plans were prepared by the consulting engineers, Burns & McDonnell.

Erie, Pa., is to build a RESERVOIR with total capacity of thirty million gallons, to cost $250,000, according to plans prepared by the consulting engineers, Chester & Fleming.

WATERWORKS IMPROVEMENTS, involving the construction of a dam, are to be made by Decatur, Ill., for which plans are being prepared by the consulting engineer, S A. Greeley. The estimated cost is $500,000.

The city of Barberton, O., has advertised for bids for the construction of a SEWER SYSTEM. Plans were prepared by the consulting engineer, R. Winthrop Pratt.

A sanitary SEWER AND SEWAGE DISPOSAL PLANT is to be built by the city of Churdan, Ia. Plans are being prepared by the consulting engineer, C. H. Currie.

Aurora, Ont., plans SEWERAGE IMPROVEMENTS to cost about $100,000, involving the installing of vitrified sewers and septic tanks. The consulting engineers, James, Loudon & Hertberg, have been retained by the city to prepare estimates.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

NORTH SEWAGE SCREEN

For Dewatering Sewage Without Use of Heat.

This is a screen of the drum type which is used for dewatering sewage, pulp and other highly diluted materials. It consists of a drum or cylinder formed of wire screening supported by a steel frame work consisting of two end wheels and lateral ribs. This drum revolves with its lower half suspended inside a vat into which falls the liquid which passes through the screen.

The sewage or other water carrying suspended matter enters at one end of the drum and passes out through the screen into the vat, from which it is drained away to the sewer or other place of disposal. The suspended matter adheres to the wire screen, dropping from the screen, as it approaches the top, into a trough which extends the full length of the drum. Particles of suspended matter too large to adhere to the screen are carried up by radial shelves which are attached to the inside of the drum, which dump such particles into the trough as they are brought to the top during the revolving of the drum. A water shower discharged against the screen from a pipe outside of the same and extending the full length of the drum dislodges from the wire the solid matter adhering to it. Another water pipe placed just beyond the further side of the trough thoroughly washes each part of the screen at each revolution.

The trough has steep sides and is semi-circular at the bottom, a screw conveyor revolving in the semi-circular bottom and moving the matter collected in the trough toward the further end where it is delivered into a cart or other receptacle. This bottom of the trough is perforated so as to afford further opportunity for escape of the liquid. The screw conveyor, as it pushes the matter along the trough, compresses it and squeezes out a part of the water still contained.

The wire screen is fastened on in strips or narrow segments from the outside, and any segment can be renewed with little trouble. The drums are made five feet in diameter and in standard sizes of 6, 8 and 10 feet long. The last has a capacity of one million gallons of sewage in 24 hours. Only one horsepower is required for driving the machine.

SEWER PIPE GASKETS.

Non-Destructible—of G-K Material.

A gasket for use in laying sewer pipe which is moulded to the desired size and can therefore be applied more quickly, will fill the joint space for the entire circumference of the pipe and which will not rot, is being offered as a substitute for jute or oakum gaskets by the Atlas Company. This gasket is made of the well-known G-K material, molded in strips 1-32 inch less in thickness than the standard annular space of sewer pipe joints and one inch wide and cut to the proper length for the size of the pipe for which it is to be used. The material can thus be inserted easily and insures a complete filling of the entire annular space, and light calking will expand it to fill the entire space.

One advantage claimed for this gasket is that it does away with the trouble of ends or loops of jute protruding into the sewer. It takes much less time to use one of these than to roll and calk into place a length of jute to be used for the same purpose. Where G-K material is used for the joint, it is found to bond perfectly with the gasket. These gaskets are acid-proof and are being used on an acid pipe line in New York 1,110 feet long. It is claimed by the manufacturers that the material cost of the gasket is no greater than that of an equal depth of calked dry jute at the present price of that material (ten cents a pound) and that there is a decided saving in the time of applying it. The gaskets are furnished packed in boxes of one hundred, there being stenciled on each box the size of pipe for which its contents are intended.

The company is also preparing a runner to be used in place of the asbestos runner, the G-K runner to be left on the pipe and to become an integral part of the joint, so that the back-filling can be begun as soon as the joint is poured.

INDUSTRIAL NEWS

Work of Industrial Board.

The following is part of a statement that has been made by Secretary Redfield, of the Department of Commerce, in connection with his acceptance of the resignations of the members of the Industrial Board: "That board was conceived in the spirit of unselfish public service and has so acted from the beginning. I repeat what was said already: There has been no change in its viewpoint, policy, or attitude from the beginning. No

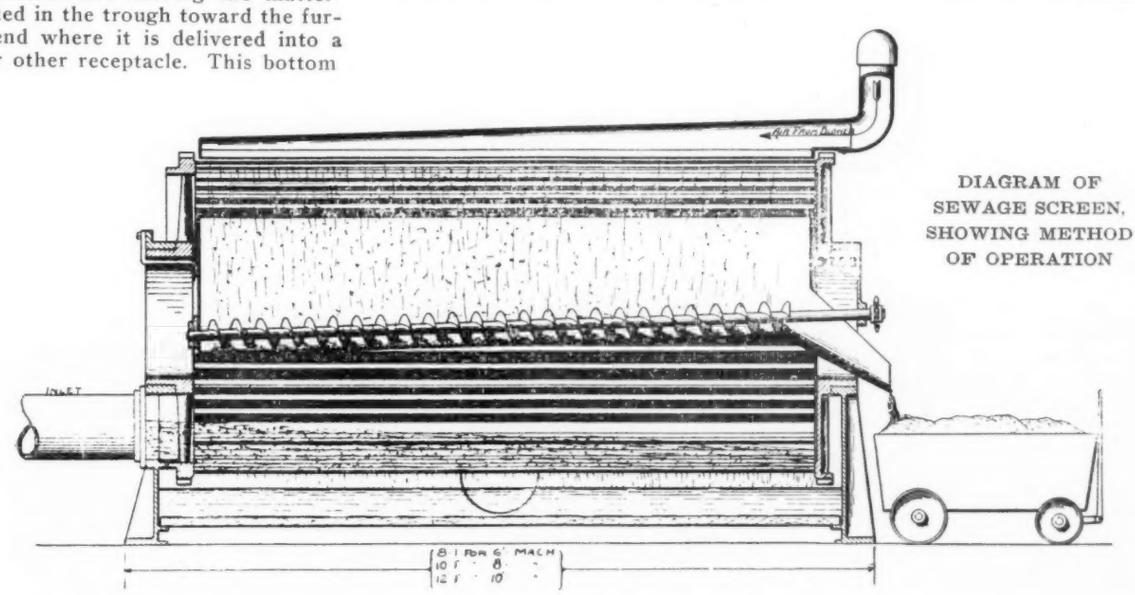


DIAGRAM OF SEWAGE SCREEN, SHOWING METHOD OF OPERATION

statement nor inference to the contrary has a basis of fact. It has had the widespread support of industry and commerce throughout the country. It has sought merely to serve and has been ready to consider all figures, to respect all facts, and to reconsider any statement or conclusion in the light of further knowledge. Its mind has been open and its purpose was directed not to winning a controversy but solely and simply to serving the country. I believe it has developed standards of public cooperation which will be of permanent value."

"Reinforcing of Concrete Roads and Pavements."

Under the above title the **Truscon Steel Company,** Youngstown, O., has issued a circular describing the use of steel reinforcement in concrete highway construction. "Truscon Road Mesh" is described and illustrated and its use shown on the Baltimore pike route. "Rib Metal" and "Truscon Armor Plates" are also shown.

The Elgin Sales Corporation, 501 Fifth ave., New York City, and 1340 Old Colony Bldg., Chicago, announces that its sales of Elgin street cleaning machines has reached the 100 mark. These 100 machines represent 78 different buyers, the other 22 machines being "repeat" orders. Recent installations of Elgin machines are in the cities of Havana, Cuba; Kalamazoo, Mich.; Yonkers, N. Y.; Bridgeport, Conn. (second machine), and Malden, Mass.

The Walter A. Zelnicker Supply Company in St. Louis has just appointed Mr. F. X. Meehan as advertising manager. Mr. Meehan comes to the Zelnicker organization with a very broad experience, having been associated in various executive capacities, with Fairbanks, Morse & Company and other concerns. Mr. Meehan was a very active "four minute man" during the war, having made over five hundred patriotic speeches.

Electrical Safety Conference.

Following recommendations from the Electrical Manufacturers' Council, representing the Electrical Manufacturers' Club, the Electric Power Club and the Associated Manufacturers of Electrical Supplies, there has been organized a new body, known as the Electrical Safety Conference, for the consideration of accident and safety questions relating to electrical manufactures and products. The organizations co-operating for the formation of this conference are the Associated Manufacturers of Electrical Supplies, the Electric Power Club, the Underwriters' Laboratories, the National Workmen's Compensation Service Bureau and the Bureau of Standards, each of which is represented on the conference by two members, who have been appointed as follows

For the Associated Manufacturers of Electrical Supplies—A. W. Berresford, Cutler-Hammer Company, Milwaukee, Wis.; S. L. Nicholson, Westinghouse Electric & Manufacturing Company, East Pittsburgh.

For the Electric Power Club—A. H. Moore, General Electric Company, Schenectady, N. Y.; Clarence C. Collens, 2d, Reliance Electric & Engineering Company, 1086 Ivanhoe road, Cleveland.

For the Underwriters' Laboratories—W. H. Merrill, 207 East Ohio street, Chicago; Dana Pierce, 25 City Hall place, New York.

For the Bureau of Standards—Dr. Morton G. Lloyd and Dr. E. B. Rosa, Bureau of Standards, Washington, D. C.

For the National Workmen's Compensation Service Bureau—Albert W. Whitney and L. L. Hall, 45 Park Row, New York.

The officers are: A. W. Berresford, chairman; A. W. Whitney, vice-chairman; Dana Pierce, secretary-treasurer.

The objects of the conference are stated as follows:

To promote by co-operative effort the orderly, consistent and proper development of practice in electrical manufactures and installations with regard to accident hazards.

To promote the development and adoption of safety standards for the construction and test of electrical appliances and for their application and installation.

To interpret and make uniform the application of electrical safety codes both in regard to general principles and in regard to particular classes of appliances and systems.

The active work of the conference as between the different co-operating associations will be conducted by means of special committees appointed from time to time, which will report back through the conference to the associations for the purpose of securing agreement and uniformity of action.

NEWS OF THE SOCIETIES

(*Continued from page 376*)

be trips to local factories of water works appliances. The manufacturers, as usual, will display a large number of exhibits.

New York State Conference of Mayors and Other City Officials.

Six important municipal problems will be considered by the New York State Conference of Mayors and Other City Officials at its annual meeting to be held at Schenectady on June 10, 11 and 12. As this is the tenth anniversary of the cities' organization, plans have been completed to make the program and the entertainment more attractive than usual. Three sessions will be held on each day, with the exception of the last, when the officials will be entertained by the city during the afternoon.

At the opening session mayor Walter R. Stone, of Syracuse, president of the conference, will discuss the progress that the cities have made during the last year and the problems they are facing, such subjects as limiting the expenditures of cities; financing the public schools; making the tax system more equitable, and the activities of municipal employes in advocating laws which increase the cost of government. Municipal health problems will be discussed at the afternoon session. Dr. Charles C. Duryee, of the state department of health, will present the results of the work he has been doing this year in scoring city health departments. City tax and revenue problems will be considered at the evening session. Senator Frederick M. Davenport will confer with the officials about the work of the joint committee of the legislature on taxation will do this year.

On the second day the officials will discuss the various plans which have been suggested for the solution of the traction problems in the cities of the state. A symposium on problems which the various cities have under consideration will be held in the afternoon.

Schenectady will entertain the officials at a dinner in the evening at which the speakers will be senator Clayton R. Lusk, of Cortland, and Governor Alfred E. Smith. Senator Lusk, who is chairman of the joint committee of the legislature now investigating seditious activities in this staate, has been asked to tell the cities how they can help the state to stamp out Bolshevism. Governor Smith will discuss "The State and Its Municipalities."

Suggestions to insure the collection of delinquent taxes will be discussed at the last session. The discussion will be led by mayor William J. Wallin, of Yonkers.

The City Clerks' Association will meet here at the same time. Plans have been made for both organizations to hold three joint sessions.

National Municipal League.

The secretary of the National Municipal League, Clinton Rogers Woodruff, has announced that he would not be a candidate for re-election to that office. In his letter on the subject addressed to the president, Lawson Purday, he says:

On May 28th next I shall have completed twenty-five years of service as secretary of The National Municipal League. Elected at the first meeting held in New York City, I have served continuously ever since. During this period the movement for higher municipal standards and democratic city government has developed to a point where a larger share of my time and attention is required than my other interests will permit me to give. I am therefore reluctantly forced to the conclusion that I must retire, so I hereby give notice that I shall not be a candidate for re-election to my present position.

I am not unmindful of all that this means in the severance of ties of a quarter of a century, but the work has become such that it must be regarded as calling for the time and efforts of one who may be regarded as professionally equipped and who will look upon it as his sole life work. This I cannot afford to do.

In taking this action it is not necessary for me to say that I shall not be giving up my interest in this work which is now more vitally important than ever, but simply pass on its active management to one who will be able to give it his undivided attention. It may sever my official relations with you and our colleagues; it cannot change my affection and respect for those who have borne the burdens of the days during that period of our history in which the National Municipal League has become a factor of no mean proportions in redeeming American Municipal Government from the indictment under which it rested and from which in many places it has not yet been relieved.

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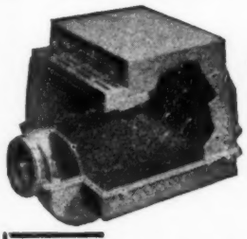

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